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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,990	11/13/2001	Volker Fischer	DE9-2000-0040 (269)	7047

40987 7590 11/03/2004	EXAMINER	
AKERMAN SENTERFITT	ALBERTALLI, BRIAN LOUIS	
P. O. BOX 3188		
WEST PALM BEACH, FL 33402-3188	ART UNIT	PAPER NUMBER
	2655	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/007,990	FISCHER ET AL.
	Examiner	Art Unit	
	Brian L Albertalli	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-26 and 28* is/are rejected.

7)☒ Claim(s) *13 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *7/12/02, 1/2/04*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.   Claims 11 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1 and 15 are directed to generating from a first speech recognizer a second speech recognizer wherein the second speech recognizer is "adapted to a specific domain". Claims 11 and 25 state that the second speech recognizer is a "general purpose speech recognizer". As cited in the specification, when a speech recognizer adapted to a certain domain, the domain is a limited set of possible vocabulary and grammar rules, such as a certain language, a dialect, only numbers, etc. (page 11, lines 9-14). A general purpose speech recognizer is not adapted to any specific domain. Therefore, claiming that the second speech recognizer is "adapted to a specific domain" and also is "general purpose" renders the claim indefinite.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4.   Claims 1-10, 14, 15-24, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Waibel et al. (U.S. Patent 6,324,510).

In regard to claims 1 and 15, Waibel et al. discloses a computerized method and machine readable storage (column 3, lines 56-61) for automatically generating from a first speech recognizer (baseline) a second speech recognizer (new domain), said first speech recognizer comprising a first acoustic model with a first decision network and corresponding first phonetic contexts (baseline is a Hierarchy of Neural Networks, HNN, trained in a diverse phonetic context), and said second speech recognizer being adapted to a specific domain (a new, unseen domain, column 6, lines 33-37), said method comprising:

based on said first acoustic model, generating a second acoustic model with a second decision network and corresponding second phonetic contexts for said second speech recognizer by re-estimating said first decision network and said corresponding first phonetic contexts based on domain-specific training data (the new domain model starts with the baseline HNN tree, and local estimators are adapted using adaptation data from the new domain, column 6, lines 40-46).

In regard to claims 2 and 16, Waibel et al. discloses said domain-specific training data is of a limited amount only (small amount of training data, column 3, lines 11-13).

In regard to claims 3 and 17, Waibel et al. discloses said re-estimating comprising:

partitioning said training data (adaptation data) using said first decision network (baseline HNN tree) of said first speech recognizer (nodes in the baseline HNN tree are monitored to see which nodes receive a large amount of adaptation data, so the adaptation data must be partitioned to the nodes of the HNN tree, column 6, lines 42-46).

In regard to claims 4 and 18, Waibel et al. discloses said partitioning step comprising:

passing feature vectors (column 6, lines 9-10) of said training data through said first decision network and extracting and classifying phonetic contexts of said training data (nodes in the HNN that do not receive enough training data are removed, thereby forming the phonetic contexts of the training data, column 6, lines 47-50).

In regard to claims 5 and 19, Waibel et al. discloses said re-estimating further comprising:

detecting domain-specific phonetic contexts by executing a split-and-merge methodology based on said partitioned training data for re-estimating said first decision network and said first phonetic contexts (nodes that receive enough training data in the

baseline HNN are kept, or remain split, and the leaf nodes of subtrees that are pruned are merged together, column 6, lines 42-46 and lines 51-55).

In regard to claims 6 and 20, Waibel et al. discloses control parameters of said split-and-merge methodology are chosen specific to said domain (nodes are removed and merged that receive less that a predetermined amount of adaptation data, column 6, lines 47-48; the adaptation automatically adjusting to the amount of available adaptation data, column 7, lines 38-39).

In regard to claims 7 and 21, Waibel et al. discloses for Hidden-Markov-Models (HMMs) associated with leaf nodes of said second decision network, said re-estimating comprises re-adjusting HMM parameters corresponding to said HMMs (HMM states corresponding to the leaves of pruned subtrees are tied to merge the leaf nodes, column 6, lines 51-55).

In regard to claims 8 and 22, Waibel discloses said HMMs comprise a set of states s_i, (HMM states s_k) and a set of probability-density-functions (PDFS) assembling output probabilities for an observation of a speech frame in said states s_i (emission probabilities) and wherein said re-adjusting step is preceded by:

selecting from said states s_i a subset of states being distinctive of said domain; and

selecting from said set of PDFS a subset of PDFS being distinctive of said domain.

Before re-adjusting HMM parameters, nodes in the HNN tree are selected that receive enough adaptation data (column 6, lines 42-46). Each node in the HNN tree is a cluster of HMM states (column 5, lines 49-51 and lines 56-58). The clusters are used to determine the emission probabilities (column 6, lines 23-27). Therefore, by selecting a node distinctive of said domain, the states s_i and PDFS distinctive of said domain are selected.

In regard to claims 9, 10, 23, and 24, Waibel et al. discloses said method is executed iteratively for additional training data (as more data becomes available, more networks in the HNN get an update, column 7, lines 41-44).

In regard to claims 14 and 28, Waibel et al. discloses that the domain is a new, unseen domain (column 6, lines 36-37). Waibel et al. further discloses that different domains include a dialect (conversational speech, line 17), and task area (business newspaper texts, lines 1-2).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 12 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waibel et al.

Waibel et al. does not explicitly disclose that the first and second speech recognizers are speaker-dependent speech recognizers and said training data is additional speaker-dependent training data.

Official notice is taken that it is notoriously well known and recognized in the art that a speaker-dependent speech recognizer is more accurate to the given speaker, and to refine the accuracy a speaker-dependent speech recognizer with additional speaker-dependent training data.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Waibel et al. so the baseline speech recognizer was speaker-dependent and the second speech recognizer in the new domain was trained with additional speaker-dependent adaptation data, since this would allow a single user to effectively adapt the second speech recognizer to a new domain without the need for training data from many other speakers, thereby saving the amount of storage needed for the speech recognizers.

Allowable Subject Matter

7.   Claims 13 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Waibel et al. discloses the creation of a second speech recognizer from a first speech recognizer adapts the second speech recognizer for a "new, smaller domain" (column 6, lines 37-39). Therefore, creating from a first speech recognizer of a first language, with training data from a second language, a second speech recognizer that is able to recognize at least the first language *and* the second language is not disclosed in the prior art of record and would not have been obvious to one of ordinary skill in the art at the time of invention.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kuhn et al. (U.S. Patent 6,711,541) discloses a method of generating phoneme models. Kuhn et al. (U.S. Patent 6,571,208) discloses a method of generating context dependent models from a large vocabulary model. Shinoda (U.S. Patent 6,173,076) discloses a method of adapting a tree based recognizer. Raman (U.S. Patent 6,014,024) discloses a method for converting a speech recognizer from one format to a second format. Zhao (U.S. Patent 5,794,192) discloses a method of adapting a speech recognizer with little training data. Takimi (U.S. Patent 5,799,277) discloses a method of generating phonetic contexts. Hab-Umbach (U.S. Patent 6,718,305) discloses a method of generating a tree structure for speech recognition.

Lewis et al. (U.S. Patent 6,334,102) discloses a method of adding new vocabulary words to a speech recognizer.

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L Albertalli whose telephone number is (703) 305-1817. The examiner can normally be reached on Mon - Fri, 8:00 AM - 5:30 PM, every second Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Smits can be reached on (703) 305-3011. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BLA 10/19/04

SUSAN MCFADDEN
PRIMARY EXAMINER